Claims

1. A substantially pure preparation of a *Candida* CAK1 polypeptide.

2. The *CAK1* polypeptide of claim 1, wherein the *CAK1* polypeptide comprises an amino acid sequence at least 75 percent homologous to an amino acid sequence represented in SEQ ID No. 14.

3. The *CAK1* polypeptide of claim 1, which polypeptide functions in one of either role of an agonist or an antagonist of cell cycle regulation of a *Candida* cell.

4. The *CAK1* polypeptide of claim 1, which polypeptide has an intrinsic kinase activity.

5. The *CAK1* polypeptide of claim 4, wherein the kinase activity of the *CAK1* polypeptide activates a *Candida* cyclin dependent kinase.

6. An immunogen comprising the polypeptide of claim 1, in an immunogenic preparation, said immunogen being capable of eliciting an immune response specific for the *Candida CAK1* polypeptide.

7. An antibody preparation specifically reactive with the polypeptide of claim 1.

8. A recombinantly produced *Candida CAK1* polypeptide.

9. The *CAK1* polypeptide of claim 8, having an amino acid sequence at least 75 percent homologous to an amino acid sequence designated by SEQ ID No. 14.

10. The *CAK1* polypeptide of claim 8, which polypeptide is a protein kinase.

11. The *CAK1* polypeptide of claim 8, which polypeptide is a fusion protein.

12. The *CAK1* polypeptide of claim 8, which polypeptide phosphorylates *Candida* cyclin dependent kinases (cdks).

13. The *CAK1* polypeptide of claim 8, which polypeptide binds to a *Candida* cyclin-dependent kinase.

14. A substantially pure nucleic acid comprising a nucleotide sequence which encodes a *CAK1* polypeptide at least 75% homologous to an amino acid sequence represented in SEQ ID No. 14.

15. The nucleic acid of claim 14, wherein the encoded *CAK1* polypeptide functions in one of either role of an agonist or an antagonist of cell cycle regulation of a *Candida* cell.

16. The nucleic acid of claim 14, wherein the encoded *CAK1* polypeptide has an intrinsic kinase activity.

17. The nucleic acid of claim 16, wherein the kinase activity of the *CAK1* polypeptide activates a *Candida* cyclin dependent kinase.

18. The nucleic acid of claim 16, wherein the phosphatase activity of the *CAK1* polypeptide phosphorylates *Candida* cyclin dependent kinases (cdks).

19. The nucleic acid of claim 14, which nucleic acid further comprises a transcriptional regulatory sequence operably linked to said nucleotide sequence so as to render said nucleotide sequence suitable for use as an expression vector.

20. An expression vector, capable of replicating in at least one of a prokaryotic cell and eukaryotic cell, comprising the nucleic acid of claim 14.

21. A host cell transfected with the expression vector of claim 20.

22. A method of producing a recombinant *Candida CAK1* protein comprising culturing the cell of claim 21 in a cell culture medium to express said *CAK1* protein and isolating said *CAK1* protein from said cell culture.

23. A probe/primer for identifying nucleic acid encoding a regulatory protein of a *Candida* cell, which probe/primer comprises a nucleotide sequence which hybridizes under stringent conditions to at least 10 consecutive nucleotides of sense or antisense sequence of a nucleic acid selected from a group consisting of SEQ ID No. 1, SEQ ID No. 2, SEQ ID No. 3, SEQ ID No. 4, SEQ ID No. 5, SEQ ID No. 6 and SEQ ID No. 13.

24. The probe/primer of claim 23, further comprising a label group attached thereto and able to be detected.

25. A diagnostic test kit for identifying nucleic acid of a *Candida* organism, comprising the probe/primer of claim 23, for measuring a level of a nucleic acid encoding the regulatory protein in a biological sample.

26. A method of identifying a compound which is an inhibitor of *CAK1* kinase, comprising the steps of:

a) generating a combination including:

1) a test agent to be assessed;

2) a cell free preparation of a *CAK1* kinase from *Candida*, and

3) a substrate of the *CAK1* kinase, other than an active cyclin dependent kinase (CDK);

b) maintaining the combination under conditions appropriate for the *CAK1* kinase to convert the substrate to product; and

c) measuring the conversion of the substrate to product,

wherein a statistically significant decrease in the conversion of substrate to product in the combination, relative to a control comprising *CAK1* kinase and the substrate and

lacking the test agent, indicates that the test compound is an inhibitor of the *CAK1* kinase.

27. The method of claim 26, wherein the *CAK1* kinase is a component of a fusion protein.

28. The method of claim 27, wherein the fusion protein is a glutathione-S-transferase/*CAK1* kinase fusion protein.

29. The method of claim 26, wherein the conversion of substrate to product provides a colorimetric indicator of kinase activity.

30. The method of claim 29, wherein the substrate is a synthetic substrate of *CAK1* kinase comprising a colorimetric label which is detectable when the substrate is converted to product.

31. The method of claim 26, wherein the *CAK1* kinase comprises a polypeptide having an amino acid sequence represented in SEQ ID No. 14.

32. An assay for screening test agents for an inhibitor of an interaction of a cyclin dependent kinase (CDK) with a *CAK1* polypeptide, comprising:

i) generating a combination including:

a) a test agent to be assessed;

b) a cell free preparation of a *CAK1* polypeptide from *Candida;* and

c) a cyclin dependent kinase;

ii) detecting the formation of a complex including said CDK and said *CAK1* polypeptide,

wherein a statistically significant decrease in the formation of said complex in the presence of said test agent, relative to the formation of a CDK/*CAK1* complex in the absence of said test agent, is indicative of said test agent being an inhibitor of the interaction between said CDK and said *CAK1* polypeptide.

33. A method for screening test agents for an inhibitor of an interaction of a cyclin dependent kinase (CDK) with a *CAK1* polypeptide, comprising:

i) providing an interaction trap system including

a) a first fusion protein comprising a cyclin-dependent kinase (CDK) portion, and

b) a second fusion protein comprising a *Candida CAK1* protein portion,

c) maintaining the interaction trap system under conditions wherein said interaction trap system is sensitive to interactions between the

CDK portion of said first fusion protein and said *CAK1* protein portion of said second polypeptide;

ii) contacting said interaction trap assay with a test agent;

iii) measuring the interactions between said fusion proteins in the presence of said candidate agent; and

iv) comparing the interactions of said fusion proteins in the presence of said candidate agent to interactions of said fusion proteins in the absence of the candidate agent,

wherein a statistically significant decrease in the level of interaction of the fusion proteins in the presence of said candidate agent is indicative of the test agent being an inhibitor of interactions between CDK and the *CAK1* protein.

34. An assay for identifying an inhibitor of a pathogen *CAK1* kinase, comprising

i. providing a cell expressing a recombinant *CAK1* kinase from *Candida*, said cell having an impaired checkpoint which causes premature entry of the cell into mitosis resulting in cell death, the premature entry into mitosis being mediated at least in part by the *CAK1* kinase;

ii. contacting the cell with a candidate agent;

iii. measuring a level of proliferation of the cell in the presence of the candidate agent; and

iv. comparing the level of proliferation of the cell in the presence of the candidate agent to a level of proliferation of the cell in the absence of the candidate agent,

wherein a statistically significant increase in the level of proliferation in the presence of the candidate agent is indicative of inhibition of the *CAK1* kinase by the candidate agent.

35. The assay of claim 34, wherein the cell-cycle checkpoint impairment comprises a increase in CAK1 activating phosphorylation of a cyclin-dependent kinase (CDK).

36. A *Schizosaccharomyces* cell comprising an expressible recombinant gene encoding an exogenous *CAK1* kinase from *Candida*.

Add a'
add #4